Integration of Artificial Intelligence into Radiology Workflow: A Narrative Review

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Abstract (300 word limit)

Title

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Abstract

Background:

The increasing demand for imaging services, coupled with workforce pressures, has placed significant strain on radiology departments worldwide. Artificial intelligence (AI) has emerged as a promising solution to enhance efficiency, accuracy, and workflow optimization. This narrative review aims to evaluate the current role of AI in radiology workflows and its potential impact on clinical practice.

Methods:

A structured narrative review of the literature was conducted using databases including PubMed, Scopus, and Google Scholar. Articles published between 2018 and 2025 were screened using keywords such as "artificial intelligence," "radiology workflow," "automation," and "diagnostic imaging." Relevant studies focusing on AI applications in workflow optimization, image interpretation, and reporting were included.

Results:

AI integration into radiology workflows demonstrates significant potential across multiple domains. In image acquisition and triage, AI tools have improved prioritization of urgent cases, particularly in stroke and trauma imaging. Automated image analysis systems have shown comparable performance to radiologists in specific tasks, enhancing diagnostic efficiency and reducing reporting times. AI-assisted reporting and structured reporting tools contribute to improved consistency and reduced variability. Additionally, workflow automation, including scheduling and protocol selection, has led to increased departmental efficiency. However, challenges remain, including integration with existing systems, data privacy concerns, algorithm bias, and the need for regulatory oversight.

Conclusion:

AI has the potential to transform radiology workflows by improving efficiency, accuracy, and consistency of imaging services. Despite promising advancements, widespread adoption requires addressing technical, ethical, and regulatory challenges. Future research should focus on real-world implementation, validation across diverse populations, and the development of standardized guidelines to ensure safe and effective integration into clinical practice.

Table

Table: Applications of AI in Radiology Workflow

Workflow Stage	AI Application	Clinical Benefit	Example Use Case
Image Acquisition	Protocol selection, scan optimization	Reduced scan time, improved image quality	Automated MRI protocol selection
Image Triage	Prioritization of urgent cases	Faster diagnosis in critical conditions	Stroke detection on CT
Image Analysis	Automated detection and segmentation	Increased diagnostic accuracy, reduced workload	Lung nodule detection on CT
Reporting	Structured reporting, NLP-assisted reporting	Improved consistency, reduced reporting variability	AI-assisted radiology report generation
Workflow Management	Scheduling, resource allocation	Improved departmental efficiency	Smart scheduling systems
Quality & Safety	Error detection, second-read systems	Reduced diagnostic errors	AI flagging missed fractures

Table 1: Applications of AI in Radiology Workflow

Recent Publications (minimum 5)

1. Friebe M. Artificial intelligence in radiology and interventions: a structured narrative review of workflow automation, accuracy, and efficiency gains. Int J Comput Assist Radiol Surg. 2026;21(1):1–10.
2. Singh SP, Ramprasad A, Makary MS. Clinical utility of artificial intelligence models in radiology: a systematic scoping review of diagnostic and endovascular applications. CVIR Endovasc. 2025;8:97.
3. Jorg T, Halfmann MC, Stoehr F, et al. A novel reporting workflow for automated integration of artificial intelligence results into structured radiology reports. Insights Imaging. 2024;15:80.
4. Radiology workflow assistance with artificial intelligence: establishing the link to outcomes. J Am Coll Radiol. 2025;In press.
5. AI in action: a roadmap from the Radiology AI Council for effective model evaluation and deployment. J Am Coll Radiol. 2025;22(9):1041–1049.
6. Artificial intelligence for diagnostics in radiology practice: a rapid systematic scoping review. 2025.

Photograph



Biography

Dr Chadehumbe has a strong interest in radiology and diagnostic imaging. Her academic interests include the application of artificial intelligence in clinical practice, particularly in improving diagnostic accuracy and workflow efficiency. She is focusing on emerging technologies in healthcare and keen to contribute to innovations that enhance patient care.

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Notes/Comments: This study demonstrates how artificial intelligence can enhance radiology workflow efficiency and diagnostic consistency, while emphasizing the need to address integration, ethical, and regulatory challenges to enable widespread clinical adoption.